

CLAIMS

1. An aerogel substrate which comprises an aerogel layer, an intermediate layer which is formed on at least one surface of the aerogel layer and a functional layer which is formed on a surface of the intermediate layer, the functional layer being formed on the surface of the intermediate layer without penetration of a material which constitutes the functional layer into the aerogel layer.

2. The aerogel substrate according to claim 1, wherein the intermediate layer prevents the material which constitutes the functional layer from penetrating into the aerogel layer.

3. The aerogel substrate according to claim 2, wherein the aerogel layer is a hydrophobic aerogel layer, the intermediate layer is formed from a hydrophilic layer which is formed by subjecting a surface of the hydrophobic aerogel layer to a hydrophilicizing treatment and a coating layer which is formed on a surface of the hydrophilic layer, and the functional layer is formed on a surface the coating layer.

4. The aerogel substrate according to claim 1, wherein the aerogel layer is a hydrophobic aerogel layer, the intermediate layer is a hydrophilic layer which is formed by subjecting a surface of the hydrophobic aerogel layer to

Related Pending Application

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a hydrophilicizing treatment, and the functional layer is formed on a surface of the hydrophilic layer.

5 5. The aerogel substrate according to claim 2, wherein the intermediate layer is an inorganic layer or an organic layer which is formed by a gas phase method.

6. The aerogel substrate according to claim 5, wherein the inorganic layer is made of an inorganic material selected from SiO_2 , SiN , SiON and TiO_2 .

10 7. The aerogel substrate according to claim 2, wherein the intermediate layer is a welded layer which is formed by heating at least one surface of the aerogel layer.

8. The aerogel substrate according to claim 2, wherein the intermediate layer is a Langmuir-Blodgett film.

15 9. The aerogel substrate according to claim 2, wherein the intermediate layer is an inorganic layered compound layer.

10. The aerogel substrate according to any one of claims 1 to 9, wherein the aerogel is a silica aerogel.

20 11. The aerogel substrate according to any one of claims 1 to 9, wherein the aerogel layer is formed on a plate member.

12. The aerogel substrate according to any one of claims 1 to 9, wherein the functional layer is an electrically conductive thin film.

25 13. The aerogel substrate according to any one of

claims 1 to 9, wherein the functional layer is an infrared ray reflective thin film.

14. The aerogel substrate according to any one of claims 1 to 9, wherein the functional layer is an optical
5 waveguide thin film.

15. The aerogel substrate according to any one of claims 1 to 9, wherein the functional layer is a transparent and electrically conductive thin film.

16. The aerogel substrate according to any one of
10 claims 1 to 9, wherein the functional layer is a fluorescent layer.

17. A process for producing an aerogel substrate having a functional layer on at least one surface thereof comprising the steps of:

15 forming an intermediate layer on at least one surface of an aerogel layer; and

forming a functional layer on a surface of the intermediate layer,

20 said intermediate layer being a layer which prevents a material which constitutes the functional layer from penetrating into the aerogel layer.

18. The process according to claim 17, wherein forming the intermediate layer comprises the steps of:

25 forming a hydrophilic layer by subjecting at least one surface of a hydrophobic aerogel layer to a plasma

treatment or a UV ozone treatment; and

forming a coating layer by coating a surface of the hydrophilic layer with an aqueous solution and/or an aqueous dispersion of a film-forming component followed by drying the solution and/or the dispersion.

19. A process for producing an aerogel substrate having a functional layer on at least one surface thereof comprising the steps of:

forming a hydrophilic layer by subjecting at least one surface of an aerogel layer to a plasma treatment or a UV ozone treatment; and

forming a functional layer by coating a surface of the hydrophilic layer with an aqueous solution and/or an aqueous dispersion of a film-forming component followed by drying the solution and/or the dispersion.

20. The process according to claim 17, wherein the step of forming the intermediate layer comprises the step of forming an inorganic layer or an organic layer by a gas phase method on at least one surface of the aerogel layer.

21. The process according to claim 20, wherein the gas phase method is selected from a CVD method, a sputtering method and a vapor deposition method.

22. The process according to claim 17, wherein the step of forming the intermediate layer comprises the step of forming a welded layer by heating at least one surface of

the aerogel layer.

23. The process according to claim 17, wherein the step of forming the intermediate layer comprises the step or forming a thin film on at least one surface of the aerogel
5 layer by the Langmuir-Blodgett method.

24. The process according to claim 17, wherein the step of forming the intermediate layer comprises the step of forming an inorganic layered compound layer by having at least one surface of an aerogel layer adsorb an inorganic
10 layered compound.

25. The process according to any one of claims 17 to 24, wherein the aerogel is a silica aerogel.

26. The process according to any one of claims 17, 19, 20, 21, 22, 23 and 24, wherein the functional layer is
15 formed by a coating method or a gas phase method.